

IWIC Leadership Team

- Steven Glaser, Faculty Director, Berkeley
- Roger Bales, Merced
- Alex Bayen, Berkeley
- Andrew Fisher, Santa Cruz
- Tom Harmon, Merced
- Ray Seed, Berkeley
- Hugh Aldridge, CITRIS

Collaborations

- CSU, Fresno
- UC, Davis Agriculture and Engineering

DRAFT

IWIC Mission

- To provide multi-disciplinary, practical and appropriate research *and* development support to enable California to create a world-leading water information and management system
- To support the development of more generally applicable systems and services for implementation around the world

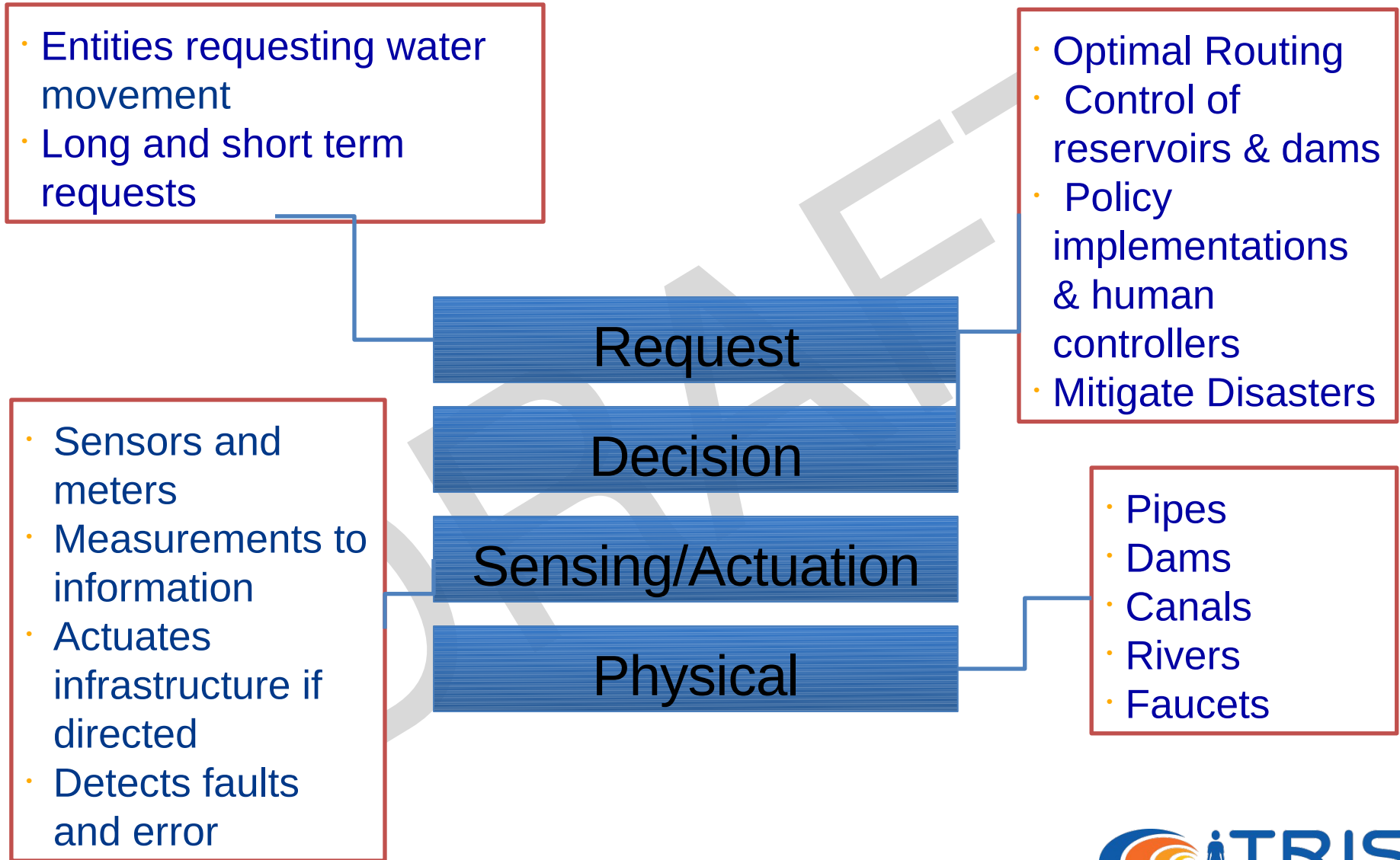
IWIC Aims

- To create a unified water monitoring system based on a cyber-physical sensing infrastructure to enable California to operate its water system more efficiently and effectively
- To support California; its cities and towns, its farmers and its industry, to meet sustainably, the challenges created by climate change, population growth and changing demographics
- With partners in the USA and around the world, to make a significant contribution to solving the world's water crisis
- To support the development of new jobs and businesses in California based upon new and globally important new technologies and services

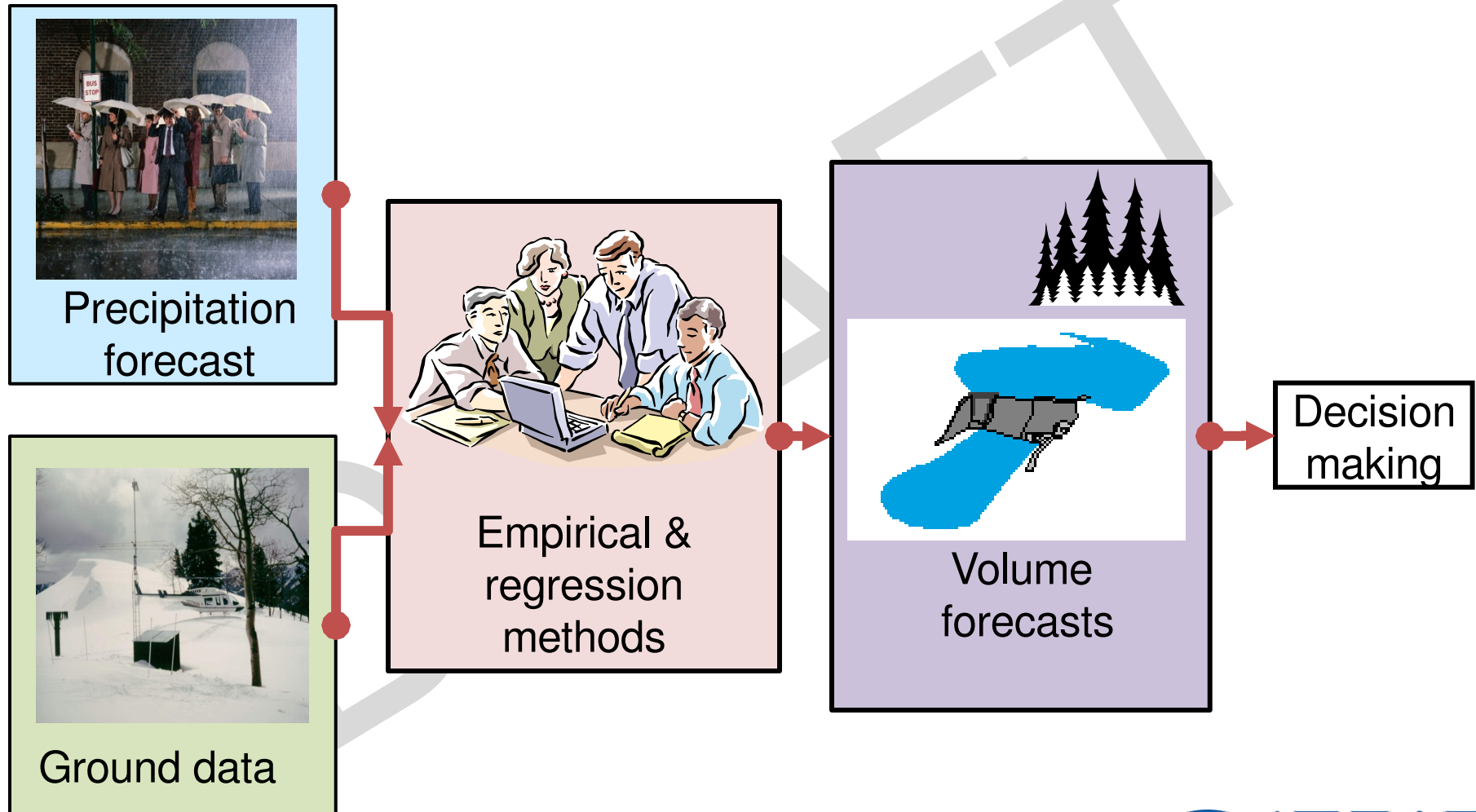
IWIC Deliverables

- Proof of the Principle that a real-time water information and management can be created in California and that such a system can:
 - Provide accurate and timely information regarding California's water resources for all stakeholders (managers, consumers, regulators and politicians)
 - Provide tools to enable the efficient management of California's water resources
- Develop water information and management for implementation around the world

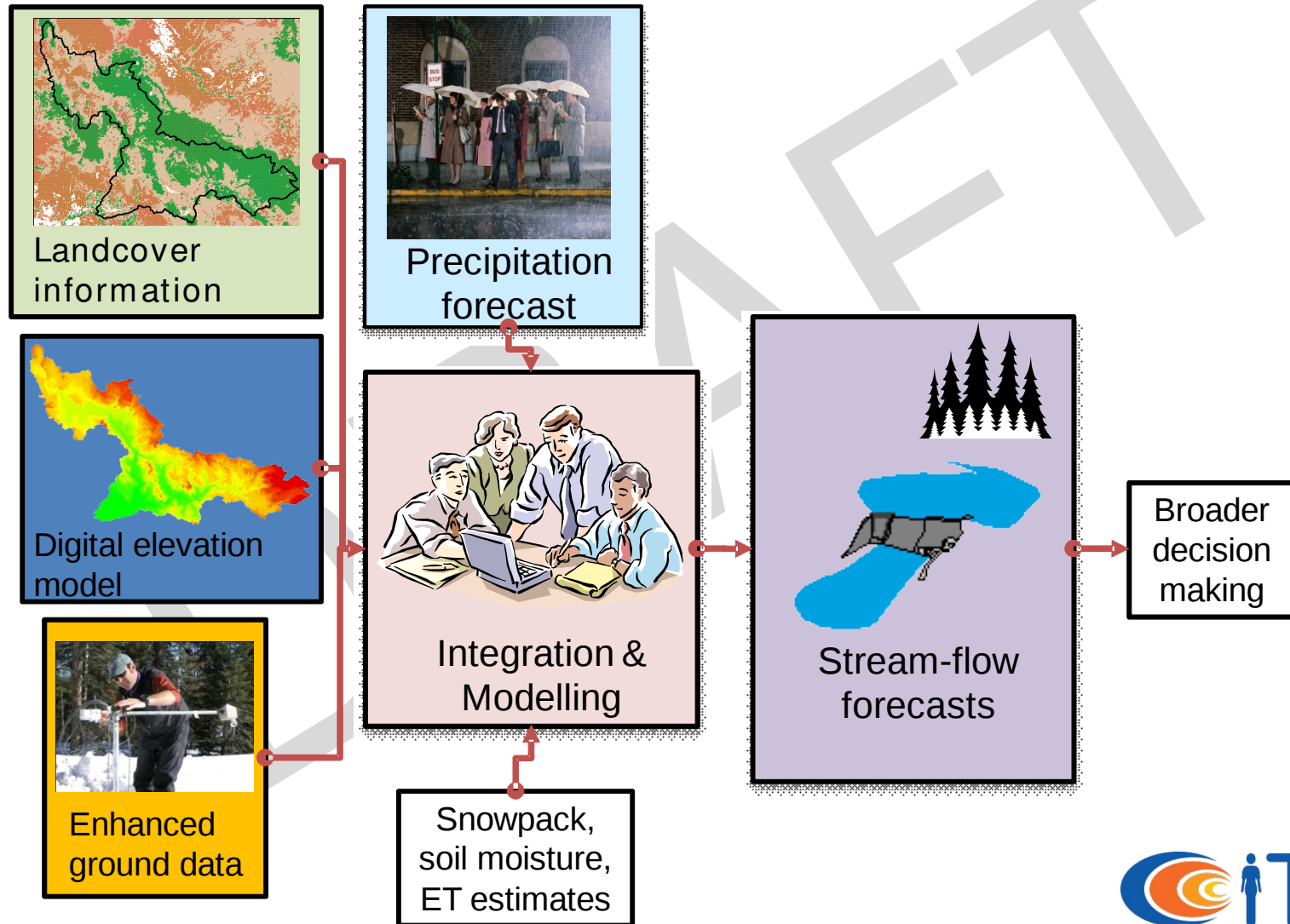
The Future: Cyber-Physical Infrastructure



Enhancing seasonal water-supply forecasting - Now



Enhancing seasonal water-supply forecasting – The Future



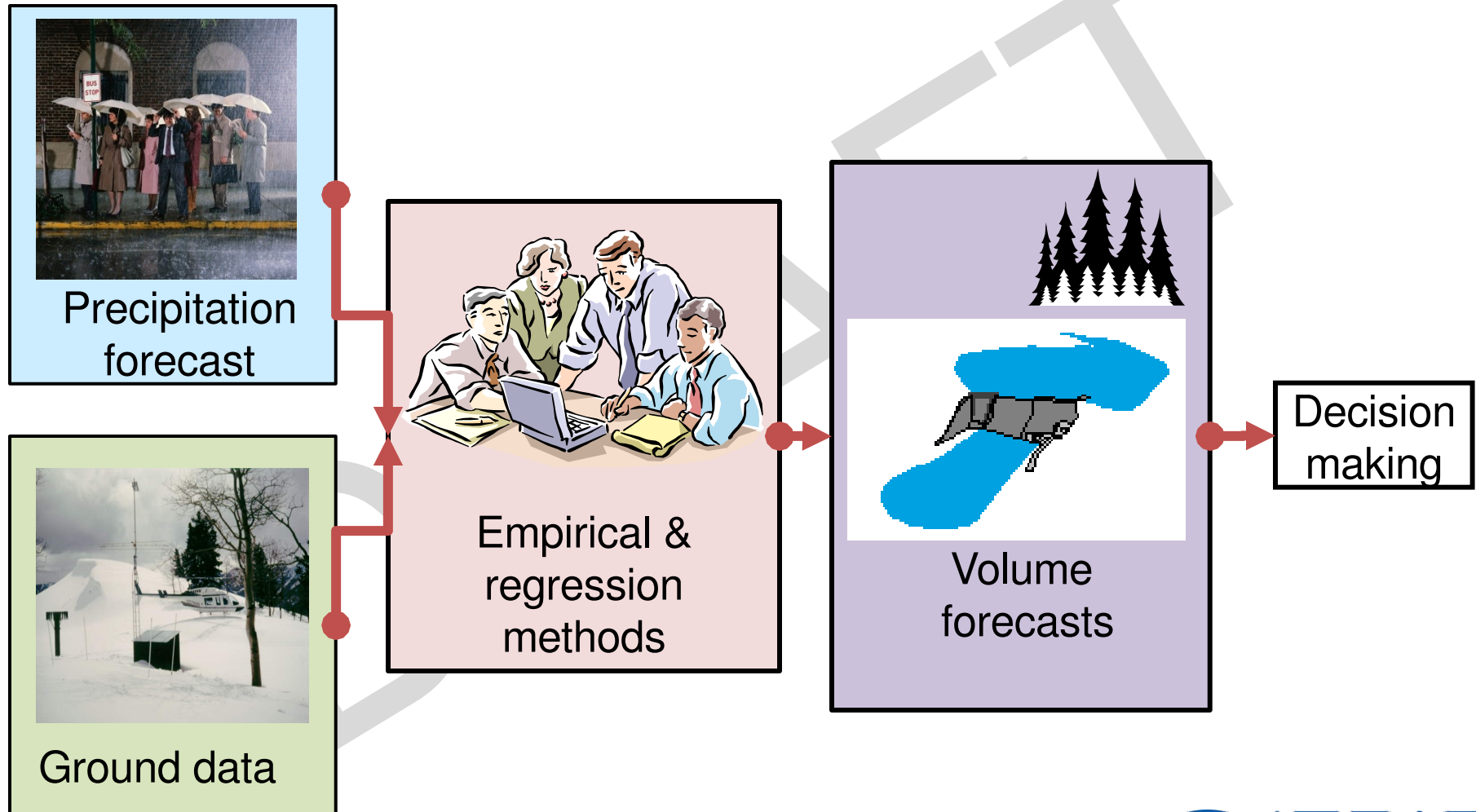
Why CITRIS?

- Created to bring world-leading research expertise to the service of California; solving major challenges
- Track-record of managing large-scale, practical and appropriate research programs
- Track-record of effective collaboration with State agencies (California Energy Commission, Cal Trans)
- Track-record of developing and implementing cyber-physical systems to address major problems in California

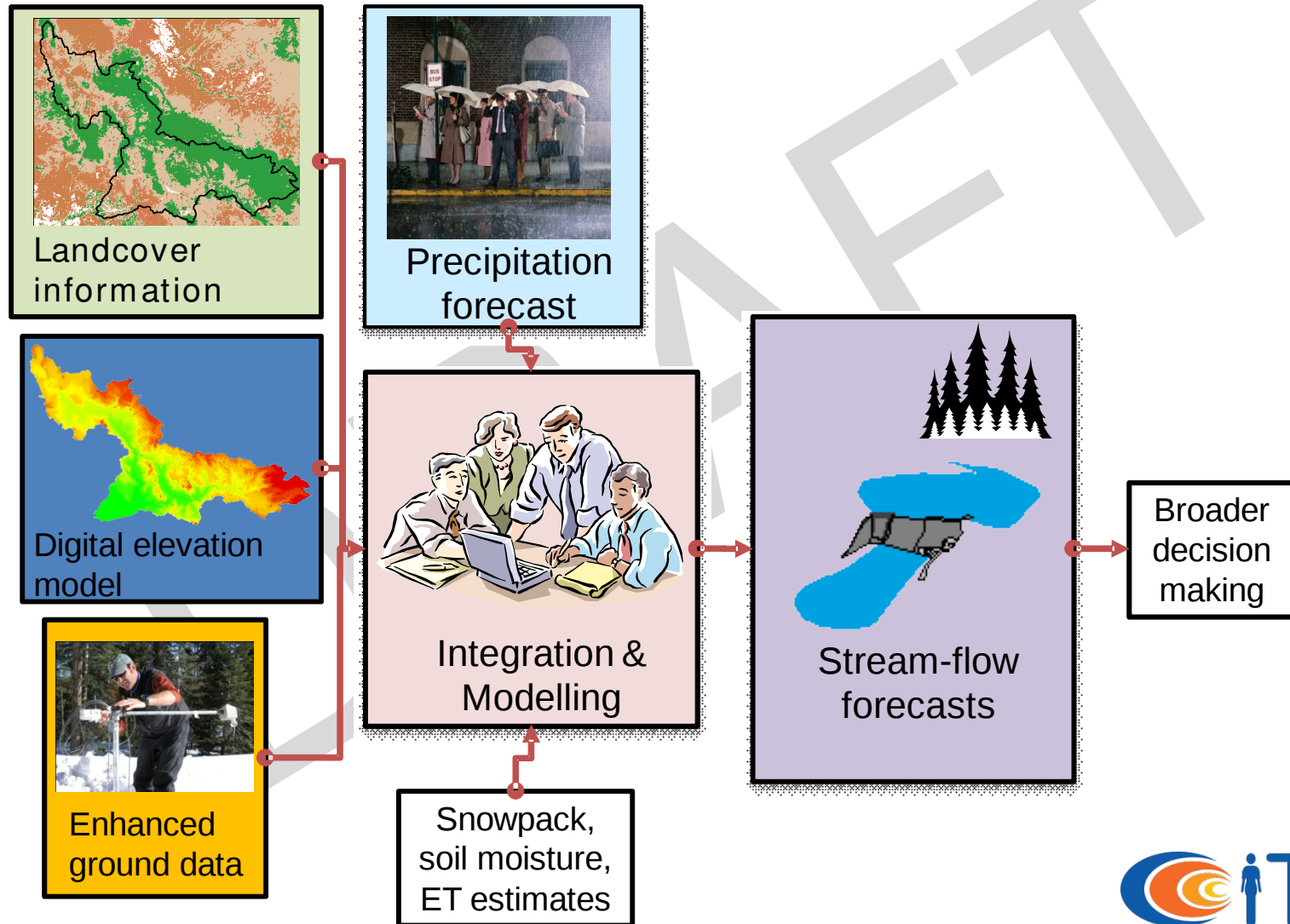
Current research assets

- Four prototype data collection systems:
 - ***Sierra Nevada Snowpack project*** (Southern Sierra Critical Zone Observatory, American River Observatory) led by Profs. Roger Bales, UCM, and Steven Glaser, UCB
 - ***Coastal Aquifer Recharge project*** led by Prof Andrew Fisher, UCSC
 - ***Delta Drifter project*** led by Prof. Alex Bayen, UCB
 - ***Delta Levee Safety project*** led by Prof. Ray Seed, UCB

Enhancing seasonal water-supply forecasting - Now



Enhancing seasonal water-supply forecasting – The Future

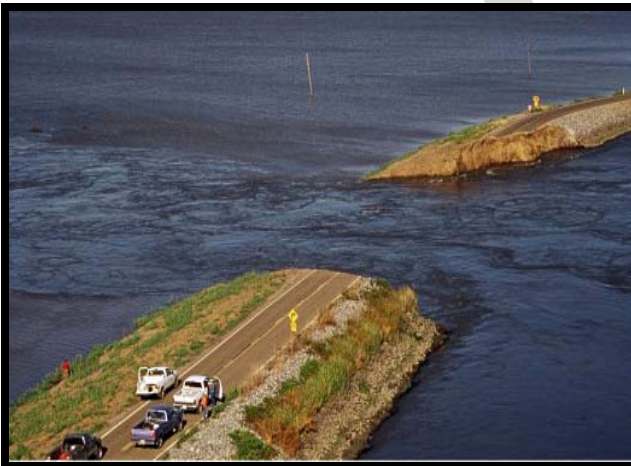


Water Supply Security



- **Seismic Levee Failure - 2011 Tohoku Earthquake, Japan**

- Delta Levee Fragility (Static and Seismic)
- Delta Water Quality and Eco-System Risk
- Canals, Dams and Other System Elements

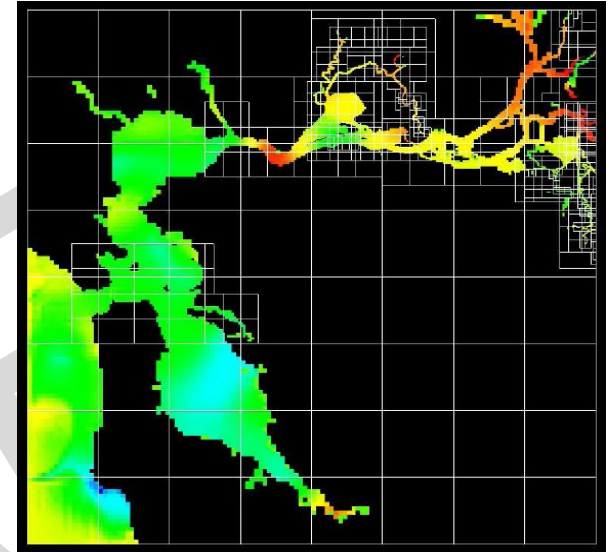


- **Static Levee Failure - 2004 Jones Tract Failure**

- Risk Assessment
- Risk Mitigation
- Emergency Response

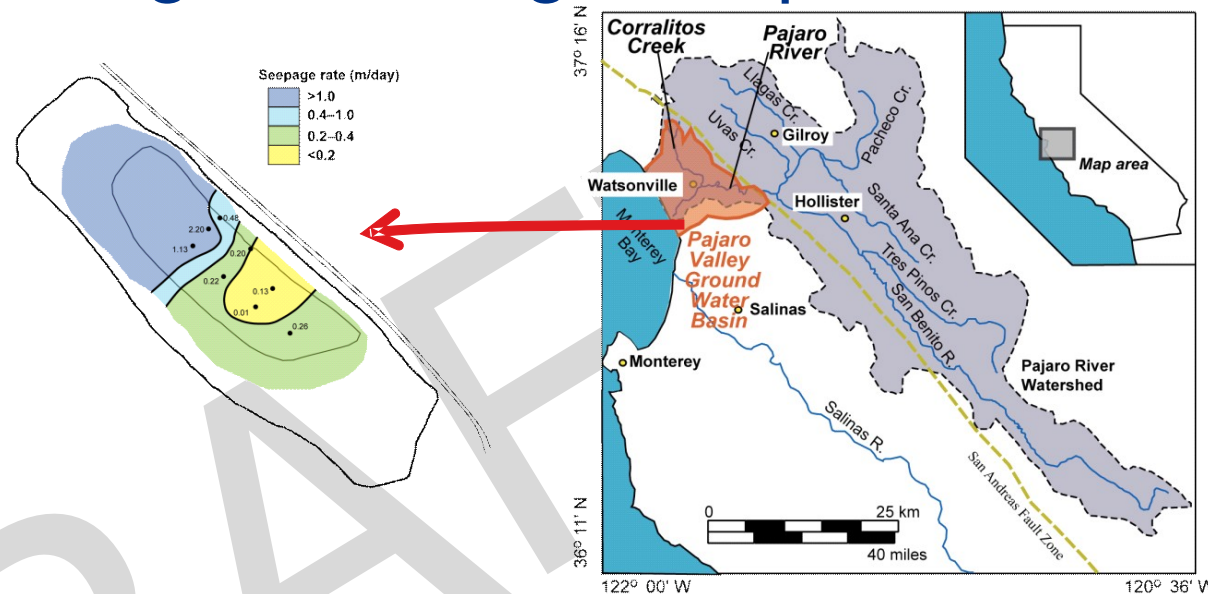
Real-time river-flow now-cast with streaming data

- Real-time data assimilation for river-flow
- Now-cast
 - Multiple hydrodynamics models running in parallel
 - Data assimilation using parallel computing
 - Google map API for real-time flow visualization and analytics
 - Data warehousing for offline data analytics
- Sensing instrumentation
 - Up to 20 USGS static sensors required



Real-time monitoring of Managed Aquifer Recharge

Water is diverted from nearby wetland, infiltrates into underlying aquifer



- The Problem: GW recharge is highly variable in space and time
- The Goal: Determine patterns of recharge in real time to assist with operations of MAR systems.
- The Solution:
 - Heat is used as a tracer to map out timing and locations of infiltration
 - Data telemetered back to base station in real time, posted at web site for rapid assessment and analysis of infiltration

Planned research

- IWIC will include projects to substantially improve understanding of each major element of the State's water system – the snow-pack, the aquifers, the river and canal system, the reservoirs
- IWIC will take multi-disciplinary approach and include:
 - Computer scientists
 - Economists
 - Ecologists
 - Engineers
 - Hydrologists
 - Political scientists

Meeting Objectives

- CITRIS cannot meet its objectives without strong relationships with key stakeholders
- IWIC is grateful for the opportunity to meet the State's key water information stakeholders
- To listen and understand the challenges and opportunities
- To build collaborations that will lead to practical and cost-effective solutions to the State's water challenges